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## CLAIMS

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[Claim(s)]

[Claim 1] It is the electronic thermometer which it is the electronic thermometer which stored the electronic-circuitry element and the cell in the cylindrical case which has at the end the diameter extension section of thin which prepared the temperature measurement section at the nose of cam, and the base material of this case is substantially formed mostly in [ the whole ] one by the same transparency member, and is characterized by coming mostly to cover the whole with the non-transparency covering member which covers the outside surface and/or internal surface of this transparency member except for a window part at least, as for this transparency member.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention has a size almost equivalent to a mercury thermometer, has the case structure of a fluid-tight structure, and relates to the electronic thermometer which detects temperature electronically and carries out digital display.

[0002]

[Description of the Prior Art] An electronic thermometer consists of the temperature measurement section which generally changes a temperature information into an electrical signal, the test section for changing the electrical signal of this temperature measurement section into a digital signal, the operation part which asks for temperature from this digital signal, the display which displays the temperature for which it asked by this operation part, a cell which supplies power to these each part, and a case which contains these. the case \*\*\*\*\* -- an end -- opening -- in order that the other end of \*\*\*\*\* may attach the temperature measurement section the bottom, it deforms into the cylinder of the letter of extension of the diameter of thin, and it has the transparent aperture which sees through the temperature display of the liquid crystal equipment which inserted in the interior and was fixed to one side of \*\*\*\*\* from the open end

[0003] Although much electronic parts, such as LSI, are built in, disinfection and washing are indispensable about the thermometer front face before and after use, and such an electronic thermometer is asked for the waterproofing structure which does not have influence in the contained parts in the infirmity, in order to prevent the infection between users. There is a thing of JP,61-47527,A as waterproofing structure of an electronic thermometer. Division formation of the case fabricated by the window part material which fabricated the electronic thermometer shown in this official report by the resin which has transparency, and the opaque resin is carried out in one by the multi-color molding (two color molding).

[0004]

[Problem(s) to be Solved by the Invention] The electronic thermometer which formed window part material and the case in one by the two color molding does not almost have a waterproof problem. However, in order to manufacture by the two color molding, completeness (the yield is 100%) cannot be told to waterproofness. In order to miniaturize an electronic thermometer furthermore, it is asked for a miniaturization of a case, and closing-in-ization with the miniaturization of electronic parts. this invention was made in view of such a technical problem, and this invention has a size almost equivalent to a mercury thermometer, realizes perfect fluid-tight nature, and aims at offering the electronic thermometer which detects temperature electronically and carries out digital display. Furthermore, this invention aims at offering the electronic thermometer which has the case which can be miniaturized.

[0005]

[Means for Solving the Problem] In order to attain such a purpose, this invention It is the electronic thermometer which stored the electronic-circuitry element and the cell in the cylindrical case which has at the end the diameter extension section of thin which prepared the temperature measurement section at the nose of cam. the base material of this case The whole is substantially formed mostly in one by the same transparency member, and this transparency member consists of an electronic thermometer characterized by coming mostly to cover the whole with the non-transparency covering member which covers the outside surface and/or internal surface of this transparency member except for a window part at least.

[0006] As for an un-transparent covering member, being formed by the paint layer is desirable. Moreover, as for an un-transparent covering member, it is desirable to cover to the outside surface of the base material of a case. As for an un-transparent enveloping layer, it is still desirable to cover to the internal surface of the base material of a housing.

[0007] The case of the electronic thermometer of this invention fabricates the base material of the housing which consists of a resin which has transparency, masks the fraction which corresponds to a window part at least by the masking member, covers the outside surface and/or internal surface of this case mainframe with a non-transparency covering member, and is manufactured by removing a masking member.

[0008] Moreover, the case of the electronic thermometer of this invention fabricates the base material of a case more to consist of a resin which has transparency, covers it with the non-transparency covering section to the outside surface and/or internal surface of this case, and is manufactured by exfoliating the fraction applicable to a window part by laser etc. Furthermore, the case of the electronic thermometer of this invention fabricates the base material of the case which consists of a resin which has the transparency which made the fraction applicable to a window part the heights, covers it with the non-transparency covering section to the outside surface and/or internal surface of this base material, and is manufactured by shaving off this heights.

[0009]

[Function] With the prior-art thought of carrying out adhesion fixation of a window part and the case mainframe, the electronic thermometer of this invention is what (it colors) fractions other than an aperture are covered for at least to the base

of the case which has transparency which is that it cannot hit on an idea of, and is completely released from the fluid-tight nature (waterproofness) problem of a window part and a mainframe. It is not necessary to produce the mold goods which prepared opening which is equivalent to a window part about a transparent case mainframe, and to paste up window part material at a back process.

[0010]

[Example] Below, this invention is explained in detail based on an example.

[0011] The 1st example is shown in drawing 1 - view 3. Drawing 1 is a perspective diagram showing the whole electronic thermometer 1 which an example shows the 1st example. A case 10 consists of a window part 20 which has the box 4 which has the diameter extension section 2 of thin, and has opacity, and transparency. As shown in drawing 2, in order to give opacity, the case 10 is covered with the non-transparency covering member except for the window part 20 at least in the outside surface and/or internal surface of the base-material 10a.

[0012] The crown-ed of the diameter extension section 2 of thin is done by the metal probe cap 5 who protects the temperature measurement section. the back end section 6 of a case 10 can insert a substrate, the cell 12, etc. carrying electronic-circuitry parts etc. -- as -- opening -- carrying out -- a cap 7 -- liquid -- it has fitted in densely It is \*\*\*\*\* which the end opened wide, and although the structure of a case 10 deformed into the diameter [ of thin ]-like cylinder in order that a nose of cam might attach the temperature measurement section, since it builds in the others and temperature measurement section, the thing of the structure which blockaded the other end and was really formed in the shape of a semi-sphere is sufficient as it.

[0013] Based on the drawing 2 and the drawing 3, it explains to a detail more. Drawing 2 is a cross section of the longitudinal direction of the electronic thermometer of this invention, drawing 3 is an enlarged view of the window part 20 of drawing 2, the non-transparency covering member 13 covers a fraction high one step, and a window part 20 constitutes the non-covering section 3 which has not been covered. As base-material 10a which has transparency, polystyrene is used and the whole is substantially formed mostly in one with the same quality of the material. The spray gun covered this base-material 10a by electrostatic coating by coating. The thickness of the non-transparency covering member 13 is about 20 micrometers, and the almost smooth front face is realized. In electrostatic coating, a coating efficiency is high, an automation is easy, and equalization can do a paint quality. An ivory white pigment is mixed using acrylic lacquer, and it was made to become the non-transparency covering member 13 as coating. In the metal probe cap 5 who consists of stainless steel, aluminum, etc., an electronic thermometer 1 is \*\*\*\*\* by the potting agent 8, and the temperature measurement sections 9, such as Sir \*\*\*\*\* which changes a temperature information into an electrical signal, are contained. The point of the diameter extension section 2 of thin is slightly made into a taper configuration, at least two or more annular ribs are prepared in a point periphery, and it becomes the thing excellent in fluid-tight nature by making the probe cap 5 fit in. The operation display 11 and the cell 12 which display the measured temperature are contained in the case 10. A window part 20 is formed in the position which corresponds with the operation display 11, and checks by looking the temperature displayed by the operation display 11 by liquid crystal, Light Emitting Diode, etc. by the window part 20. a cap 7 -- the back end section 6 of a case 10 -- liquid -- it has fitted in densely A cap 7 can paste up by the posterior part 6 of a case 10, adhesives, ultrasonic weld, etc. in order to raise fluid-tight nature. Moreover, if the part in which the non-transparency covering member 13 is not formed besides window part 2 is established and a cell 12 is formed there as a solar battery, it becomes unnecessary to exchange a cell. Moreover, the need for exchange of a cell is lost by considering as the rechargeable battery which can charge a cell 12 from the exterior. Moreover, it becomes unnecessary to prepare a pushbutton switch, a baton switch, etc. in the exterior of a case 10 by preparing a magnet reed switch in a case 10 at ON and OFF of the power of a cell 12. moreover, the cap 7 -- an O ring -- minding -- the back end section 6 of a case 10 -- liquid -- it can also fit in densely As base-material 10a of the case 10 which consists of a resin which has transparency, if it is a transparent resin, although anything is sufficient as the material, the ease of carrying out of injection molding to thermoplastics is desirable, and can use polyester system resins, such as cellulose esters, such as acrylic resins, such as polyolefine system resins, such as polystyrene system resins, such as polystyrene and a butadiene styrene copolymer, a Polly 2-methyl pentene, and polypropylene, and poly-\*\*\*\*\* methacrylate, and a cellulose acetate, and a polyethylene terephthalate, etc.

[0014] base-material 10a of the case 10 in which the non-transparency covering member 13 has transparency except for a part -- the whole is covered mostly The fraction (non-covering section) not to cover serves as a window part 20 as it is. window part material transparent in the notching part of an un-transparence conventionally case -- liquid -- although devised by fixing densely, base-material 10a of the case which has transparency in the way of thinking with this invention completely contrary to this serves as a window part as it is, and the electronic circuitry laid in the case 10 is mostly covered by the non-transparency covering member 13 Since it is formed by one member as a case 10, perfect fluid-tight nature and waterproofness are realized. Anything is sufficient as the non-transparency covering member 13 as long as it is fixed, without exfoliating on the front face of cases, such as paint and printing.

[0015] When putting the non-transparency covering member 13 by paint, in order to paint, it is required for base-material 10a and covering nature of a case 10 which consist of a resin which has transparency to choose good coating. A fluidity may be good, and the conditions with good covering nature may have small surface tension, and the chemical structure of base-material 10a of the concerned case 10 and coating and the polarity may be similar. Furthermore, as a selection condition of coating, although solvent resistance, chemical resistance, and safety are mentioned, these conditions are excepted, when painting inside a housing. When painting inside, since neither processing of disinfection etc. nor the influence of a human body touches with coating, it is satisfactory. although coating has the width of face of selection according to the quality of the material of base-material 10a of a case 10 which consists of a resin which has the transparency painted -- dividing roughly -- \*\* -- there is a solvent vaporization type \*\* self-reaction hardening type \*\* heating hardening type Only by a solvent evaporating, using as a vehicle what melted the hard resin of nature or synthesis in the solvent, solvent vaporization type coating forms a hardening paint film, and is the so-called lacquer or varnish. It is suitable for the low plastic-molding object of

a heat deflection temperature. As such solvent vaporization type coating, there are cellulose system lacquer, vinyl system lacquer, and acrylic lacquer. Self-reaction hardening type coating has an oxidation-polymerization type, a multi-liquid reaction type, and a moisture hardening type. A heating hardening type produces the chemical bridging reaction of the functional group which heats and exists in a coating vehicle, and has an alkyd resin coating, \*\*\*\*\*, an alkyd resin coating, an acrylic resin coating, etc. In addition, there is optical hardening type (ultraviolet-rays hardening type) coating. Before painting, as for base-material 10a of the case which consists of a resin which has transparency, it is desirable to carry out surface treatment to a painted surface. It is enabled to raise the covering nature of coating by carrying out surface treatment to base-material 10a of the case which consists of a resin which has transparency. There are a chemical preparation and physical processing as surface treatment. As a chemical preparation, there are a chemical treatment, coupling-agent processing, a steam treatment, graft processing, and the electrochemical technique, for example. Physical processing has for example, ultraviolet-rays processing, a plasma treatment, and an ion irradiation.

[0016] Although it becomes base-material 10a of the case 10 which consists of a resin which has transparency, and the factor with the important covering nature of the non-transparency covering member 13, when forming the non-transparency covering member 13 by paint, in order to improve the covering nature on the front face of a paint film, it is desirable to give an under coat. while choosing the material with which it should be satisfied of the property of being asked for base-material 10a and coating of a case, respectively -- \*\*\*\* -- when inferior in the covering nature, it is suitable to use a primer as an under coat

[0017] If it paints to the outside surface of base-material 10a, smoothing of the irregularity of an outside surface can be carried out, and the flow mark of the outside surface of a case 10 can be covered. On the other hand, when it paints to the internal surface of base-material 10a, there is almost no fear of sublation of the covering layer by the non-transparency covering member 13. In order to carry out smoothing of the irregularity of the outside surface of base-material 10a of a case 10 furthermore, you may paint a surfacer to an outside surface. By about 5-20 micrometers, although the flattening is so possible that thickness is large for the thickness of the non-transparency covering member 13 in irregularity, the problem of sagging of paint also comes out of it. Moreover, although selection of the solvent of coating is required for the crazing crack of a paint layer, it can be prevented by carrying out the annealing of the base-material 10a (moldings) of a case 10 in advance.

[0018] There is the technique of printing besides [ which has been described above as the technique of forming the non-transparency covering member 13 on base-material 10a ] paint. As the printing technique, there are dry offset printing, screen-stencil, special situation printing (curl fit), etc.

[0019] As the manufacture technique of the case 10 of the electronic thermometer 1 of this invention \*\* Fabricate base-material 10a of the case 10 which consists of a resin which has transparency, and mask the fraction which corresponds to a window part 20 at least by the masking member. It covers with the non-transparency covering member 13 to the outside surface and/or internal surface of base-material 10a of this case 10. Base-material 10a of the case 10 which consists of the technique of removing a masking member and a resin which has \*\* transparency is fabricated. It covers with the non-transparency covering member 13 to the outside surface and/or internal surface of base-material 10a of this case 10. Base-material 10a of the case 10 which consists of a resin which has the transparency which made the heights the fraction which corresponds to a window part 20 at least is fabricated. the technique of exfoliating the fraction which corresponds to a window part 2 at least by laser etc., and \*\* -- It covers with the non-transparency covering section to the outside surface and/or internal surface of base-material 10a of this case 10, and technique \*\* cutting off this heights can illustrate typically.

[0020] Such technique is explained using a drawing. Drawing 4 fabricates base-material 10a of the case 10 which consists of a resin which has transparency which is the technique of above-mentioned \*\*, masks the fraction which corresponds to a window part 20 at least by the masking member 14, and covers it with the non-transparency covering member 13 to the outside surface and/or internal surface of this base-material 10a, and how to remove the masking member 14 is shown. There are paint, printing, etc. as the technique of covering. The masking member 14 should mask only the fraction equivalent to the window part 20 which has transparency at least. As for the field to cover, it is more desirable than an adhesive point to carry out surface treatment mentioned above. Which of the outside surface of base-material 10a and an internal surface or both are sufficient as what are covered. When covering an outside surface, even if it is the long and slender case 10, it is easy to cover that it can mask from an outside, and easily. Furthermore, although a case 10 is usually produced by the plastic-molding object, it can carry out smoothing of the irregularity of the front face by covering. When covering an internal surface, peeling of the covering member 13 does not pose the problem on use as an electronic thermometer. There is also no problem on paint of paint unevenness, dripping, etc., and a manufacturing process and a quality assurance become easy. By covering to the internal surface of base-material 10a, applicability is not narrowed by material selection of the covering member 13 from the field of the safety to the human body for the inside of - opening for the bottoms of the side. a covering member -- an inside-and-outside side -- since the operation effect by choosing which (or both) is common in the following technique, the following describes the operation effect of only the fraction different from this technique

[0021] Drawing 5 is drawing showing how to exfoliate the fraction which fabricates base-material 10a of the case 10 which consists of a resin which has transparency which is the technique of above-mentioned \*\*, covers with the non-transparency covering member 13 to the outside surface and/or internal surface of base-material 10a of this case 10, and corresponds to a window part 20 at least by laser etc. (elimination). The advantage of this technique is to be able to simplify the process to cover. moreover, the covering member 13 is corresponded to a window part 2 at least with laser -- since partial sublation (elimination) is carried out -- the burr in the boundary section 15 with the covering section 13 of the periphery of a window part 20 -- not coming out (hard) -- while a fine sight is not spoiled, back processes, such as deburring \*\*, become unnecessary Drawing 6 is a drawing in which how to fabricate base-material 10a of the case 10 which consists of a resin which has the transparency which made the heights 16 the fraction applicable to a window part 20 which is the technique of above-mentioned \*\*, to cover with the non-transparency covering member 13 to the outside surface and/or internal surface of

this housing, and to shave off this heights 16 is shown. the heights 16 of this technique -- the covering section 13 -- being thick (high) -- when shaving off a heights 16, it can carry out easily a heights 16 -- shaving off -- the un-transparent covering member 13 is removed and base-material 10a should just come out to a front face Especially the effect of this technique does not need a device for covering processes, such as paint, but its yield in the painting process of an electronic thermometer which has the long and slender case 10 improves.

[0022]

[Effect of the Invention] The electronic thermometer of this invention has transparency, and since it forms a window part in the base material of the case which formed the whole in one mostly with the same quality of the material substantially by covering a window part with an opaque member at least, it is completely released from the fluid-tight nature (waterproofness) problem of a window part and a case mainframe. It is not necessary to produce the mold goods which prepared opening which hits a part for a window part in a transparent mainframe, and to paste up window part material at a back process.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is a slant-face view showing the example of the electronic thermometer of this invention.

[Drawing 2] Drawing 2 is a cross-sectional view of the electronic thermometer of drawing 1.

[Drawing 3] drawing 3 -- a part of drawing 2 -- it is an expanded sectional view

[Drawing 4] Drawing 4 is a cross section explaining the example of 1 manufacture of the electronic thermometer of this invention.

[Drawing 5] Drawing 5 is a cross section explaining another example of a manufacture of the electronic thermometer of this invention.

[Drawing 6] Drawing 6 is a cross section explaining other examples of a manufacture of the electronic thermometer of this invention.

[Description of Notations]

- 1 -- Electronic thermometer
- 2 -- Diameter extension section of thin
- 3 -- The non-covering section
- 4 -- Box
- 5 -- Probe cap
- 7 -- Cap
- 8 -- Potting agent
- 9 -- Temperature measurement section
- 10 -- Case
- 10a -- Base material of a case
- 11 -- Operation display
- 12 -- Cell
- 13 -- Non-transparency covering member
- 14 -- Masking member
- 20 -- Window part

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[Translation done.]

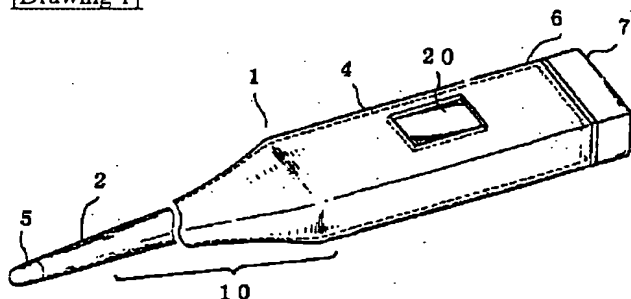
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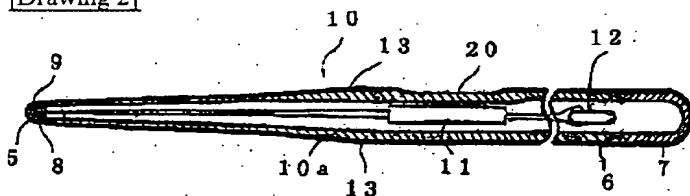
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DRAWINGS

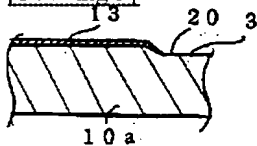
[Drawing 1]



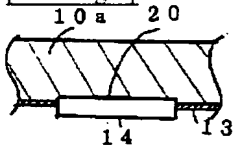
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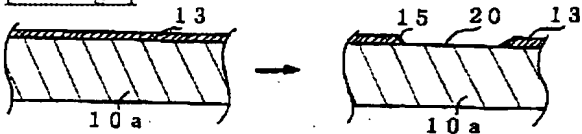
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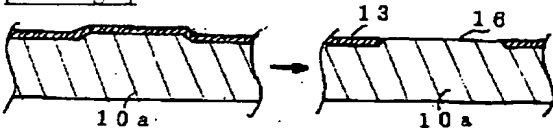
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]